

Delta Operations for Salmonids and Sturgeon (DOSS) Group
Conference call: 1/8/2019 at 9:00 a.m.

Objective: Provide advice to the Water Operations Management Team (WOMT) and National Marine Fisheries Service (NMFS) on measures to reduce adverse effects from Delta operations of the Central Valley Project and the State Water Project on salmonids and green sturgeon. DOSS will work with other technical teams. DOSS notes and advice can be found at:

http://www.westcoast.fisheries.noaa.gov/central_valley/water_operations/doss.html.

CDFW: Kyle Griffiths, Jason Julianne, Duane Linander, Ken Kundargi

DWR: Bryant Giorgi, Farida Islam

NMFS: Kristin Begun

Reclamation: Elissa Buttermore, Tom Patton, Towns Burgess

SWRCB: Chris Carr, Craig Williams

Agenda Items

1. Agenda review and introductions
2. RPA Implementation review (For the DOSS Dashboard, click on the "Triggers & Indices" tab at: www.baydeltalive.com/djfmfp)
3. Current Operations
4. Smelt Working Group
5. Fish Monitoring: RSTs/trawls/seines
6. Fish Monitoring: Salvage
7. Hatchery Releases
8. DOSS Estimates of Fish Distribution
9. DOSS Feedback on Entrainment Risk
10. DOSS advice
11. Next DOSS meeting

Agenda Item 2.

RPA Implementation Review

Delta RPA Actions affecting operations during January:

Action IV.1.1 (Alerts that indicate the Delta Cross Channel (DCC) gate operations may be triggered soon)¹:

- Starting on 10/1, the First Alert is triggered if either the first component (>95 cfs flow threshold) or second component (>50% change in mean daily flow) has been exceeded at either the Deer Creek gage at Vina (DCV), or the Mill Creek gage at Los Molinos (MLM). See table below for details.

¹ For details, see pages 60-61 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/0711_ocap_opinion_2011_amendments.pdf. Note that in October 2014, NMFS approved a modification of the first component of the first alert to a 95 cfs mean daily flow threshold in either Mill Creek or Deer Creek in lieu of operating the Mill and Deer Creek rotary screw traps.

Mill Creek (MLM)			Deer Creek (DCV)	
Date	mean daily flow (cfs)	change in mean daily flow	mean daily flow (cfs)	change in mean daily flow
1/1/19	136	-6%	139	-7%
1/2/19	132	-3%	131	-6%
1/3/19	129	-2%	128	-3%
1/4/19	128	-1%	125	-2%
1/5/19	133	4%	133	6%
1/6/19	553	316%	617	363%
1/7/19	555	0%	620	0%

- Second Alert (triggered only if both Knights Landing water temperatures are <56.3°F and Wilkins Slough flows are >7,500 cfs). The second alert was triggered on 1/7. See table below for details.

Wilkins Slough (WLK)		Knights Landing (KL)
Date	Mean Daily Flow (cfs)	Daily water temperature (°F)
1/1/19	6,338	*
1/2/19	6,048	44.9
1/3/19	5,931	44.6
1/4/19	5,896	45.0
1/5/19	5,861	45.1
1/6/19	5,993	45.5
1/7/19	8,604	46.0

*Knights Landing temperature not available for 1/1, but is assumed to be below 56.3°F.

Action IV.1.2² (DCC gate operations):

- DCC gates will remain closed per operations described in RPA IV.1.2 starting 12/1/18.

Action IV.2.3³ (OMR Management):

- Implementation of this action in WY 2018 began on 1/1/19, and requires that Old and Middle River (OMR) flow be no more negative than -5,000 cfs. OMR flows are reported weekly with the OMR index and the tidally filtered USGS gauges at the 5-day and 14- day running averages.

Action IV.3³ (Reduce likelihood of entrainment or salvage at the export facilities, including an alert that indicates that export operations may need to be altered):

- The third alert [November 1-February 28 Knights Landing Catch Index (KLCI) or Sacramento Catch Index (SCI) >10] was not triggered this past week. Since the action went into effect on 11/1/18, no salvage-based triggers that would require export reduction have been exceeded.

² For details, see pages 62-66 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/0711_ocap_opinion_2011_amendments.pdf

³ For details, see pages 79-80 in Enclosure 2 of the 2011 Amendments to the 2009 RPA document at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/0711_ocap_opinion_2011_amendments.pdf

Agenda Item 3.**Current Operations (1/8/19)**

SWP		CVP	
Exports (cfs)			
Clifton Court Forebay	2,100*	Jones Pumping Plant	3,500
Reservoir Releases (cfs)			
Feather - Oroville	1,750	American - Nimbus	1,750
		Sacramento - Keswick	4,000
		Stanislaus - Goodwin	200
		Trinity - Lewiston	300
Reservoir Storage (in TAF)			
San Luis (SWP)	871	San Luis (CVP)	675
Oroville	1,044	Shasta	2,297
New Melones	1,799	Folsom	314
Delta Operations			
DCC	Closed	Sacramento River at Freeport (cfs)	16,649**
Outflow Index (cfs)	~16,400	San Joaquin River at Vernalis (cfs)	1,211***
E:I	34% (14-day avg.)	X2	>81 km

* SWP exports will increase to approximately 2,500 cfs over the next couple of days to maintain OMR.

** Sacramento River flows are expected to rise over the next couple days to over 30,000 cfs.

*** San Joaquin River flows may rise up to 1,600 cfs this week.

Factors controlling Delta exports:

- 1/2/19-1/8/19: -5,000 cfs OMR limit per NMFS BiOp RPA Action IV.2.3

Approximate OMR as of 1/5/19:

	USGS gauges (cfs)	Index (cfs)
Daily	-5,600	-4,900
5-day	-5,400	-5,000
14-day	-6,100	-6,300

Approximate OMR as of 1/7/19:

	Index (cfs)
Daily	-4,900
5-day	-4,900
14-day	-6,100

Weather Forecast

A storm will bring precipitation tonight and tomorrow mostly north of I-80, and move southward tonight. 0.75-1.5 inches of rain is expected in the Sacramento area. Snow levels will decrease to 5,500-6,500 feet tomorrow. Drier weather expected on Thursday and Friday. A similar system is expected later this week, mostly over southern CA.

Agenda Item 4.

Smelt Working Group

The Smelt Working Group (SWG) met on Monday, 1/7/19. No significant changes were made from the previous meeting. The SWG will meet again on Wednesday afternoon to discuss the results of a DWR turbidity transect that will be conducted today. **The final meeting notes were not available at the time of the DOSS call. The following summary is preliminary and is subject to change.**

The turbidity criteria that would trigger action 1 has not been met, however, DWR turbidity transect conducted on Friday did show that a turbidity bridge has formed between the lower San Joaquin River and Clifton Court Forebay. DWR will conduct another turbidity transect today and will provide an updated map on Wednesday morning (1/9). SWG may recommend action 1 if turbidity remains elevated.

Catch update: EDSM collected 1 Delta Smelt near Broad Slough (FL = 65 mm) this morning. Last week EDSM collected 1 Delta Smelt near in the Deep Water Ship Channel near Liberty Island, along with 3 Wakasagi.

Smelt Larva Survey collected 4 larval Longfin Smelt in the Lower San Joaquin River. All were 7mm total length indicating that they hatched recently. This is normal for this time of year and not cause for concern. Smelt Larva Survey has finished processing 29% of the samples collected last week. They prioritize the south and central Delta identified stations in the Longfin Smelt ITP; more larvae are expected to be observed downstream as those samples get processed.

EDSM also collected 23 LFS in Suisun last Wednesday (FL = 60 – 91 mm).

Agenda Item 5.

Fish Monitoring: The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. Empty cells indicate zero catches at those locations with sample dates shown.

Location	GCID RST ^A	Tisdale RST ^B	Knights Landing RST ^C	Beach Seines ^D	Sacramento Trawl ^D	Chippis Is. Midwater Trawl ^D	Mossdale Kodiak Trawl ^D
Sample Date	1/2-1-4	12/31-1/7	1/1-1/7	12/31, 1/3-1/4	12/30-1/2, 1/4	12/30, 1/1-1/2, 1/4	12/31, 1/2, 1/4
FR Chinook	216 juveniles	4	3	42	1		
SR Chinook	1 juvenile			15			
WR Chinook	17 juveniles 2 smolts		1	1	1		
LFR Chinook	9 smolts	1				1	
Chinook (ad-clip)	6 LFR smolts					12	
Steelhead (wild)							
Steelhead (ad-clip)	2						
Green							

Sturgeon							
Flows (avg. cfs)	818	6,041	6,180				
W. Temp. (avg. °F)	47.87	51	45.2				
Turbidity (avg. NTU)	NA	13.1	11.99				

^A The GCID RST was raised on the morning of 1/4 due to predicted high flows and heavy debris.

^B Tisdale RST sampling period was from 12/31 at 9:30 am to 1/7 at 9:30 am. Both RST traps fishing at 50% effort.

^C Knights Landing RST sampling period was from 1/1 at 12:00 pm to 1/7 at 11:00 am. RST trap reduced to 50% effort on 1/1 and returned to 100% effort on 1/2.

^D Data reported in the 12/30 to 1/5 DJFMP sampling summary.

Enhanced Delta Smelt Monitoring (EDSM):

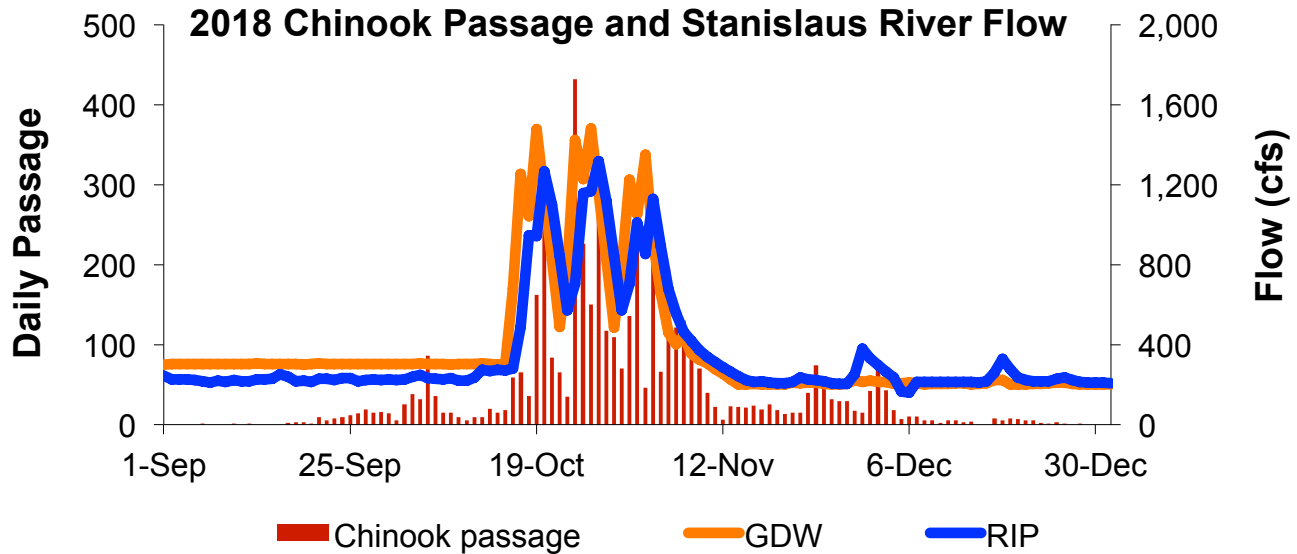
Two ad-clipped Chinook salmon were caught in the EDSM sampling at the lower Sacramento River.

CDFW carcass surveys

- ***San Joaquin River tributaries:*** Chinook salmon carcass surveys, with incidental redd counts, began the week of 10/1/18 on the Merced River, Tuolumne River, and Stanislaus River. CDFW has completed the ninth week of surveys. No data were collected this week.
- ***American River:*** Chinook salmon carcass surveys began on Monday, 10/15/18. The survey area is from Nimbus Dam to Watt Avenue. The Nimbus Basin was closed to all fishing on 3/1. Chinook salmon spawning is currently monitored in this area. On 12/31, 1/2-1/3, 238 total fish were observed between Nimbus Dam and the Fair Oaks Bridge. The weir was pulled out during the week of 12/10 and is no longer part of the survey. 1 of 16 female carcasses observed were unspawned, 12 were spawned, and 3 were unknown due to deteriorated conditions. Water temperatures in the survey reaches were a mean of 49.3°F at the farthest point upstream at the Hazel Avenue Bridge.

Stanislaus River weir

Monitoring at the weir near Riverbank (for upstream passage of adult salmonids) began on 9/5/18. Last week (12/26/18 – 1/1/19); 2 adult fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and 0 steelhead (*O. mykiss*) were observed passing upstream of the weir. The cumulative net upstream passage through 1/1/19 is 4,775 Chinook salmon (26% were ad-clipped, indicating a verifiable hatchery origin; hatcheries ad-clip 25% of their production fall-run Chinook salmon), and 22 steelhead (data provided by FISHBIO in their 1/2/19 Stanislaus Weir Update). Thirteen of the steelhead passing the weir were greater than 16 inches. Of these 13 fish, 4 were ad-clipped indicating a hatchery origin, and 9 were unclipped indicating a natural origin.



Acoustic-tagged green sturgeon

CDFW has acoustic-tagged 40 juvenile sturgeon (35 green sturgeon and 5 white sturgeon) captured between 7/24/18 and 12/27/18 near Sherman Lake on the Sacramento River (western Delta). Fork lengths of these fish range between 39 cm and 94 cm. 31 individuals have been detected (near the Sherman Lake tagging location) between 8/14/18 and 1/3/19.

Other Surveys

The following fish hatchery spawning data are provided to inform DOSS members of potential hatchery influence on catch numbers at monitoring locations. Data from additional hatchery spawning programs and other carcass surveys may be provided in the future as they become available to DOSS.

- **Feather River Fish Hatchery Spawning**

No updates were provided for this week's DOSS call.

- **Mokelumne River Fish Hatchery**

On 12/11, the Mokelumne River Fish Hatchery satisfied its egg take goal this season of 6.82 million fall-run Chinook salmon eggs. Steelhead egg take has initiated at the Mokelumne River Fish Hatchery. The seasonal egg take goal is 400,000; this number will be achievable using fish entering the hatchery this season along with broodstock already at the hatchery held over from last season.

- **Nimbus Fish Hatchery**

Last updated from 12/19, the last fall-run Chinook salmon pair was spawned 12/13 and approximately 8.4 million eggs were collected this season. As of 12/19, 13 steelhead pairs have been spawned.

Agenda Item 6.

Fish Monitoring: Salvage

Griffiths (CDFW) provided a salvage summary for the period of 12/31-1/6.

Winter-run and late-fall run sized Chinook salmon were salvaged at both the state and federal facilities. 4 wild winter-run Chinook salmon and 18 adipose fin clipped late-fall-run Chinook salmon were salvaged at the Skinner Fish Protective Facility.

16 wild winter run Chinook salmon and 20 adipose fin clipped late-fall run Chinook salmon were salvaged at the Tracy Fish Collection Facility this past week. No steelhead or sturgeon were observed in salvage this past week.

The older juvenile daily loss densities ranged from 0.15 – 1.74 fish/TAF (Thousand Acre Feet).

Counts were reduced at the state facility due to high salvage rates 12/31-1/1. No reduced counts occurred at the federal facility.

DOSS Weekly Salvage Update

Reporting Period: December 31-January 6, 2019
Prepared by Kyle Griffiths on January 7, 2019 15:12
Preliminary Results -Subject to Revision

Criteria	31-Dec	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	Trend	
Loss Densities									
Wild older juvenile CS	0.15	0	1.74	0.26	0	0	0.27	↗	0.34
Wild steelhead	0	0	0	0	0	0	0	→	0.00
Exports									
SWP daily export	9,406	4,385	4,400	4,252	4,225	4,015	3,753	↘	4,919
CVP daily export	8,123	6,740	7,201	6,982	6,997	7,006	6,982	↘	7,147
SWP reduced counts	54%	29%	0	0	0	0	0	↘	12%
CVP reduced counts	0	0	0	0	0	0	0	→	0%

Loss Density = fish lost/TAF; water export = AF; Trend = compared to previous week; wild = adipose fin present

Loss = estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage (see below)

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Yellow highlighted dates indicate TFCF salvage outage occurred

Chinook Salmon Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Race determined by size at date of capture; hatchery = adipose fin missing;

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild					
Winter Run	20	29	↗	24	31
Spring Run	0	0	→	0	0
Late Fall Run	0	0	→	6	11
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	20	29		30	43
Hatchery					
Winter Run	0	0	→	0	0
Spring Run	0	0	↘	32	21
Late Fall Run	38	92	↗	118	159
Fall Run	0	0	→	0	0
Unclassified	0	0	→	0	0
Total	38	92		150	180

Trend = weekly loss per race; Salvage = estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time

NC = cannot be calculated; hatchery salmon salvage and loss estimates have been corrected using CWT readings when available

Steelhead Weekly/Season Salvage and Loss

Combined salvage and loss for both CVP and SWP fish facilities

Category	Weekly Total			Season Total	
	Salvage	Loss	Trend	Salvage	Loss
Wild	0	0	→	4	17
Hatchery	0	0	→	4	3
Total	0	0		8	20

State Water Project loss = salvage x 4.33; Central Valley Project loss = salvage x 0.68

CONFIRMED HATCHERY (ADIPOSE-FIN CLIPPED) CHINOOK SALMON LOSS AT THE SWP & CVP DELTA FISH FACILITIES as of 1/6/18

Release Date	CWT Race	Hatchery	Release Site	Release Type	Confirmed Loss	Number Released ¹	Total Entering Delta	% Loss of Number Released ²	% Loss of Total Entering Delta ³	First Stage Trigger	Date of First Loss ⁴	Date of Last Loss ⁴
12/3/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	27.76	61,277	n/a	0.045	n/a	0.5%	12/27/2018	1/3/2019
12/14/2018	LF	Coleman NFH	Battle Creek	Spring Surrogate	10.4	66,266	n/a	0.016	n/a	0.5%	12/27/2018	12/30/2018
1/4/2019	LF	Coleman NFH	Battle Creek	Spring Surrogate	0	73,952	n/a	0.000	n/a	0.5%	n/a	n/a

SWP and CVP adipose-fin clipped Chinook lost from 10/1/2018 through 1/6/2019.

¹Number released with the adipose-fin clipped and a coded-wire tag (CWT).

²% Loss of Number Released = (Confirmed Loss/Number Released)*100.

³% Loss of Total Entering Delta= (Confirmed Loss/Total Entering Delta)*100.

⁴ Date of first and last loss accounts for all CWT loss even those from special studies where salvage and loss=0.

DWR-DES Revised 1/7/2019

Preliminary data from DFW, DWR, FWS, and Reclamation; subject to revision.

Agenda Item 7.

Hatchery Releases

On 1/4/19, the U.S. Fish and Wildlife Service provided a notification for the planned experimental release of approximately 74,000 brood year 2018 juvenile late-fall-run Chinook salmon on 1/4/19 into Battle Creek at Coleman National Fish Hatchery (CNFH). This group is 100% marked (with an adipose-fin clip and coded-wire tagged) and has an estimated average fork length of 145 mm. The purpose of this experimental release is to provide insight into the migratory behavior and fate of yearling spring-run Chinook salmon emigrating from the upper Sacramento River and its tributaries.

On 1/4/19, the U.S. Fish and Wildlife Service provided a hatchery release notification for the planned release of approximately 438,000 brood year 2018 steelhead from CNFH on 1/5/19 to 1/8/19, into the Sacramento River at Bend Bridge, 14 miles downstream of Battle Creek. This group is 100% marked (with an adipose-fin clip) and has an estimated average fork length of 195 mm.

Agenda Item 8.

DOSS Estimates of Fish Distribution

DOSS estimates of the current distribution of listed Chinook salmon as a percentage of the population, are based on recent monitoring data and historical migration timing patterns.

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chippis Island)
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	25-38% (Last week: 30-40%)	62-75% (Last week: 60-70%)	0% (Last week: same)
<i>Young-of-year (YOY) spring-run Chinook salmon</i>	83-85% (Last week: 88-90%)	15-17% (Last week: 10-12%)	0% (Last week: same)

Rationale for distribution

Wild winter-run Chinook:

19 wild winter-run Chinook salmon were observed at the GCID RST, 1 at Knights Landing, 1 at the beach seines, and 1 at Sacramento trawl. Since some winter-run were observed at monitoring locations upstream, DOSS estimates that an additional 2-5 percent of wild winter-run Chinook salmon population has migrated into the Delta. Since no winter-run were observed at Chippis Island trawl, no wild winter-run Chinook salmon are estimated to have exited the Delta.

Wild spring-run Chinook:

1 wild spring-run Chinook salmon was observed at the GCID RST and 15 at the beach seines. Since several spring-run were observed at monitoring locations upstream and within the Delta, DOSS estimates that an additional 5 percent of the population has entered the Delta. Since no spring-run were observed at Chippis Island trawl, no wild spring-run Chinook salmon are estimated to have exited the Delta.

Agenda Item 9.

DOSS Feedback on Entrainment Risk

DOSS provides weekly entrainment risk outlooks by considering (a) two different categories of entrainment risk based on listed fish distribution and (b) factors that influence their potential for entrainment. The two entrainment risk categories considered include:

- **Interior Delta Entrainment Risk**- fish in the Sacramento River that have the potential to be entrained into the Interior Delta through the Delta Cross Channel (when open) and/or Georgiana Slough; and
- **CVP/SWP Facilities Entrainment Risk**- fish in the Interior Delta that have the potential to be entrained into the CVP/SWP facilities.

Influencing factors considered include:

- **Exposure Risk** (both categories)- estimated scale (low, medium, high) of fish anticipated to be in vicinity of an entrainment risk,
- **Routing Risk** (Interior Delta Entrainment Risk)- estimated scale (low, medium, high) that flow split conditions could result in fish migrating into the interior delta instead of remaining in main channel, and
- **OMR/Export Risk** (CVP/SWP Facilities Entrainment Risk)- for fish in the Interior Delta, estimated scale (low, medium, high) that OMR and/or Export levels could result in entrainment into the CVP/SWP facilities.

To provide an overall assessment of entrainment risk, the estimated current status of these influencing factors are described below for each of the entrainment risk categories.

Interior Delta Entrainment Risk for listed salmonids in the Sacramento River over the next week:

- **Exposure Risk: MEDIUM-HIGH**
 - Approximately 62-75% of winter run juveniles estimated to be in the Delta.
 - Central Valley steelhead are in the system.
 - Expected storm this week to increase river flows.
 - Anticipate outmigration event to coincide with increased flow.
- **Routing Risk: LOW**
 - DCC is closed.
 - Flows are predicted to be high enough to mute tidal effects around Georgiana Slough.
- **Overall Entrainment Risk: MEDIUM**

CVP/SWP Facilities Entrainment Risk for listed salmonids in the Interior Delta over the next week:

- **Exposure Risk: MEDIUM**
 - Listed Chinook salmon have been salvaged and observed in monitoring sites in the Delta.

- **OMR/Export Risk:**
 - OMR -2,500 cfs: LOW
 - OMR -3,500 cfs: LOW
 - OMR -5,000 cfs: LOW-MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: MEDIUM-HIGH
 - OMR -9,000 cfs⁴: HIGH

- **Overall Entrainment Risk:**
 - OMR -2,500 cfs: LOW-MEDIUM
 - OMR -3,500 cfs: LOW-MEDIUM
 - OMR -5,000 cfs: MEDIUM
 - OMR -6,250 cfs⁴: MEDIUM-HIGH
 - OMR -7,500 cfs⁴: MEDIUM-HIGH
 - OMR -9,000 cfs⁴: HIGH

These assessments are based on current hydrology and fish distributions.

Agenda Item 10.

DOSS Advice to WOMT and NMFS: None

Agenda Item 11.

Next Meeting: The next DOSS conference call will be on **1/15/19 at 9am.**

⁴By request of management, DOSS also assessed risks at an OMR flow more negative than -5,000 cfs.